

Work Order ID 61737

Tuesday, August 31, 2010 3:22:51 PM



Page 1

Item ID: D212-664-101

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 8/31/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 9/13/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan:



Date: 10-8-31 Tooling:

Date:

Run Start



QC:

Date: SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr	Revision Nbr
D212-664-141	Rev D

100



DOCUMENT CONTROL

DC

Document Control

Memo

0.00

H for BG 10-9-16
S_darlic

110



Pick Kit

0.00

Packaging

Packaging

Memo

0.00

(X) MB 10-09-08

120



BENDING MACHINE - CROSSTUBES

0.00

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101

(X) MB 10-09-08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Date: _____

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Date: _____

Run Start



QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130



QC15- Crosstube Dimensional Check

0.00

S 10/09/10 S

QC

Quality Control

140



Crosstubes

0.00

Crosstubes

Memo

0.00

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549,using drill table DT8577, set-up towers in hole #7 as per QSI 10

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

SAD
10-09-09

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Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat within 24 hours of bending and drilling

160

QC5- Inspect part completeness to step on W/O

0.00



QC

Quality Control

Memo

0.00

170

Outsource process - NDT per QSI038 4.1

0.00



Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038
 Issue P/O: 12557
 LPI as per ASTM 1417 Level 2
 Attach copy of NDT results to work order

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Cust Item ID:

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Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

180

Receive & Inspect for Damage & Mat'l Certs
Packaging

0.00

Packaging

Memo

0.00

Ensure copy of NDT results attached to work order.

190



QC5- Inspect part completeness to step on W/O

0.00

Quality Control

Memo

0.00

Inspect for damage & ensure results are as per Dwg D212-664-141

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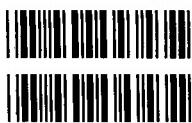
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Reference:

Approvals: Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start



QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInspec.
Stamp

200



Spray Painting per QSI005 4.2

0.00

ET 10.09-19

SprayPaint

0.00

Memo

1-Prime inside and outside crosstube as per QSI 005 4.2
2-Paint outside crosstube with White Imron as per QSI 005 4.2

SprayPaint

PRIME:

Start Time: 11:00
Finish Time: 12:00

Spray Painting

PAINT:

Start Time: 3:30
Finish Time: 4:30

210



QC14- Inspect Spray Paint

0.00

ML 10.09.15(1)

QC

Quality Control

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

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Cust Item ID:

Required Date: 9/13/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

220



Crosstubes

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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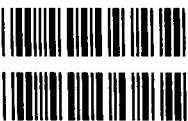
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Customer:

Reference:

Approvals: Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start



QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

Sequence ID/
Work Center ID

250



QC

Quality Control

Operation
Description

QC4- 100% Inspect kits for completeness

Set Up/
Run Hours

0.00

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

S. Clark

260



Packaging

Packaging

Packaging

Memo

0.00

0.00

Rav E

Malib

270



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

10/09/16

MF
10-9-16

W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE			By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

Picklist Print

Tuesday, August 31, 2010 3:22:56 PM

Page 1
3

Work Order ID: 61737



Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 8/31/2010

Required Date: 9/13/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E 04.02.16 Reformat KJ/DS

IPP Rev:F 06-03-29 Remove Coments on Pick List JLM

IPP Rev:G 07-04-30 As per Rev C JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D212-664-101TRN



Manufactured

No

110

Each

1.0000

1

1

B614.00 MD, 10-08-08

Crosstube Turning Detail

Location	Loc Qty	Loc Code
----------	---------	----------

LG

1

61158

1

D3595-063-450



Manufactured

No

230

Each

68.6590

4

4.210526

W/ 10-09-25

RUBBER CUSHION

Location	Loc Qty	Loc Code
----------	---------	----------

LG

68.65897368

53775

5.97897368

58161

3.56

59580

10.12

60983

49

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Tuesday, August 31, 2010 3:22:56 PM

Page 2

Work Order ID: 61737



Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 8/31/2010

Required Date: 9/13/2010

Start Qty: 1.00

Required Qty: 1.00

MS21920-25



Purchased

No

220

Each

95.0000

4

4

Clamp(per MIL-DTL-8783C)

M/ 10.09.15

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

LG	55	
----	----	--

113281	0	
--------	---	--

114759	5	
--------	---	--

114901	25	
--------	----	--

115278	25	
--------	----	--

ST451	40	
-------	----	--

113281	5	
--------	---	--

113282	18	
--------	----	--

113744	1	
--------	---	--

114141	16	
--------	----	--

D2893-1



Manufactured

No

220

Each

35.0000

2

2

2.75 Support

M/ 10.09.15

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

LG	35	
----	----	--

56354	16	
-------	----	--

59457	19	
-------	----	--

D3428-1



Manufactured

No

240

Each

7.0000

1

1

Placard

Ref/16(1)

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST056	7	
-------	---	--

60484	7	
-------	---	--

60484

W/O:		WORK ORDER CHANGES							
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Work Order ID: 61737



Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 8/31/2010

Required Date: 9/13/2010

Start Qty: 1.00

Required Qty: 1.00

AN6-35A
BOLT



Purchased	No	240	Each	47.0000	4	4
-----------	----	-----	------	---------	---	---



L

AN6-36A
Bolt



Purchased	No	240	Each	56.0000	4	4
-----------	----	-----	------	---------	---	---



115207

L

MS21042L6
Nut



Purchased	No	240	Each	314.0000	6	6
-----------	----	-----	------	----------	---	---



L

AN960JD616
Washer



NAS1149D0663J Purchased No

Purchased	No	240	Each	0.0000	18	18
-----------	----	-----	------	--------	----	----



11144980

L
m115589 Proprietary

W/O:		WORK ORDER CHANGES					
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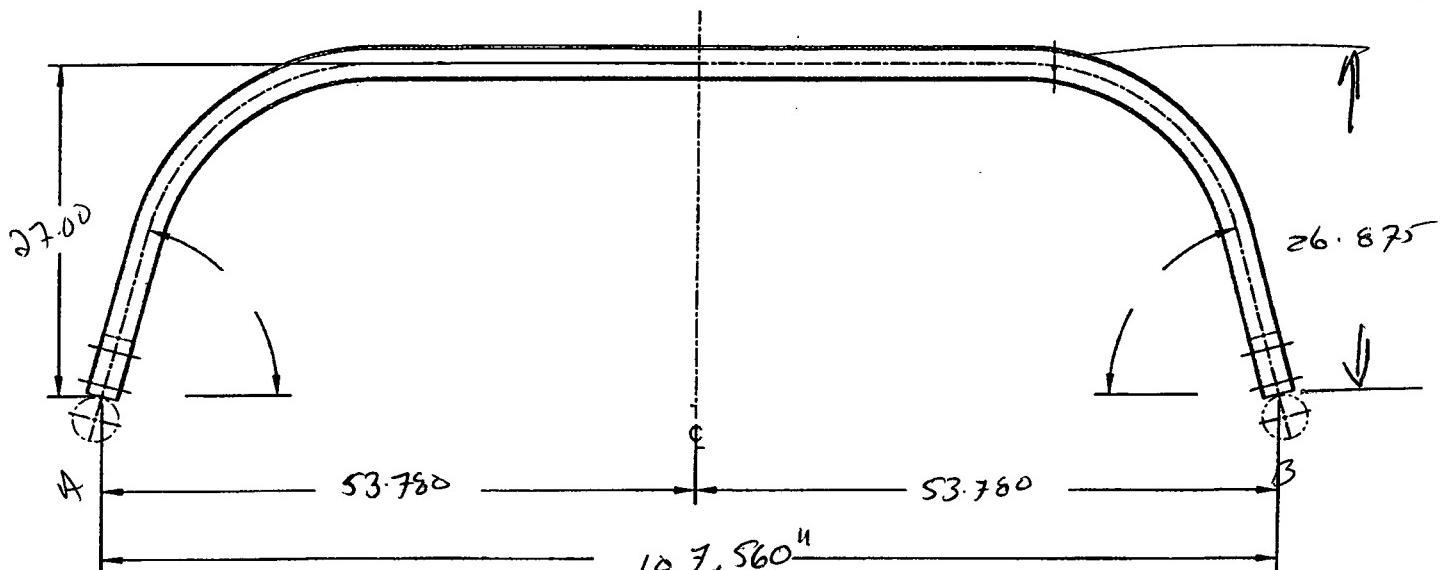
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DART AEROSPACE LTD	Work Order:	61737
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: D		Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments

QC15 Inspection	S
Date	10/09/08

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	
C	10.04.01	Dwg Rev updated	KJ	J

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8 7 6 5 4 3 2 1



Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. U737
PF 10-8-3

RELEASED
2009-10-9

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, CB-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>PH</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	REV. D SHEET 1 OF 4	
CHECKED	<i>PP</i>	DRAWING NO. D212-664-141	
MFG. APPR.	<i>DA</i>	SCALE NTS	
APPROVED	<i>MP</i>	TITLE XTUBE ASSY (205/212/412 HI FWD)	
DE APPR.	<i>AF</i>	DATE 09.09.30	
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8 7 6 5 4 3 2 1

D

C

B

A

D

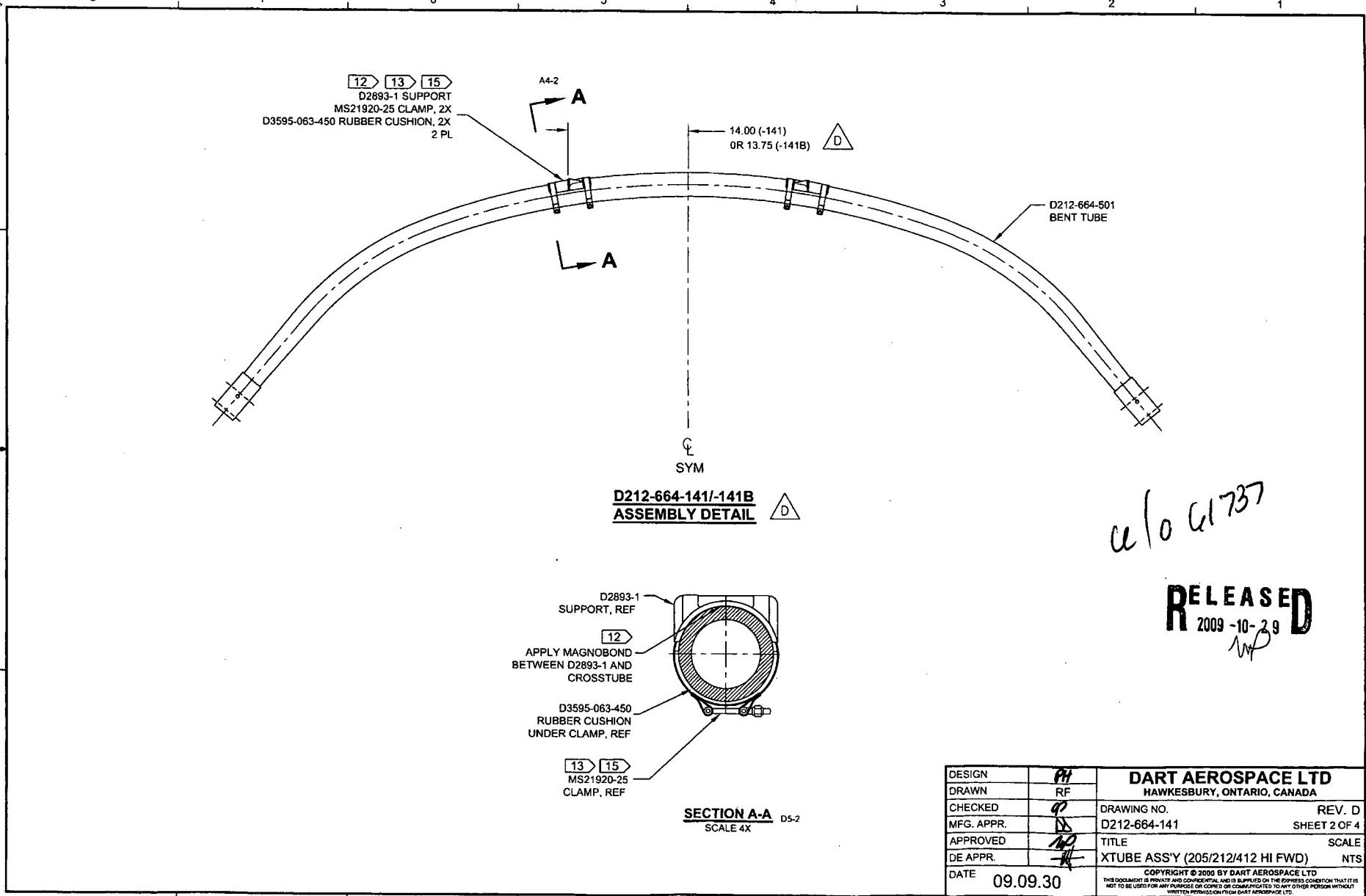
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



DESIGN	<i>PF</i>	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	<i>PF</i>	REV. D
MFG. APPR.	<i>DA</i>	DRAWING NO. D212-664-141 SHEET 2 OF 4
APPROVED	<i>MP</i>	TITLE XTUBE ASS'Y (205/212/412 HI FWD) SCALE NTS
DE APPR.	<i>MP</i>	DATE 09.09.30

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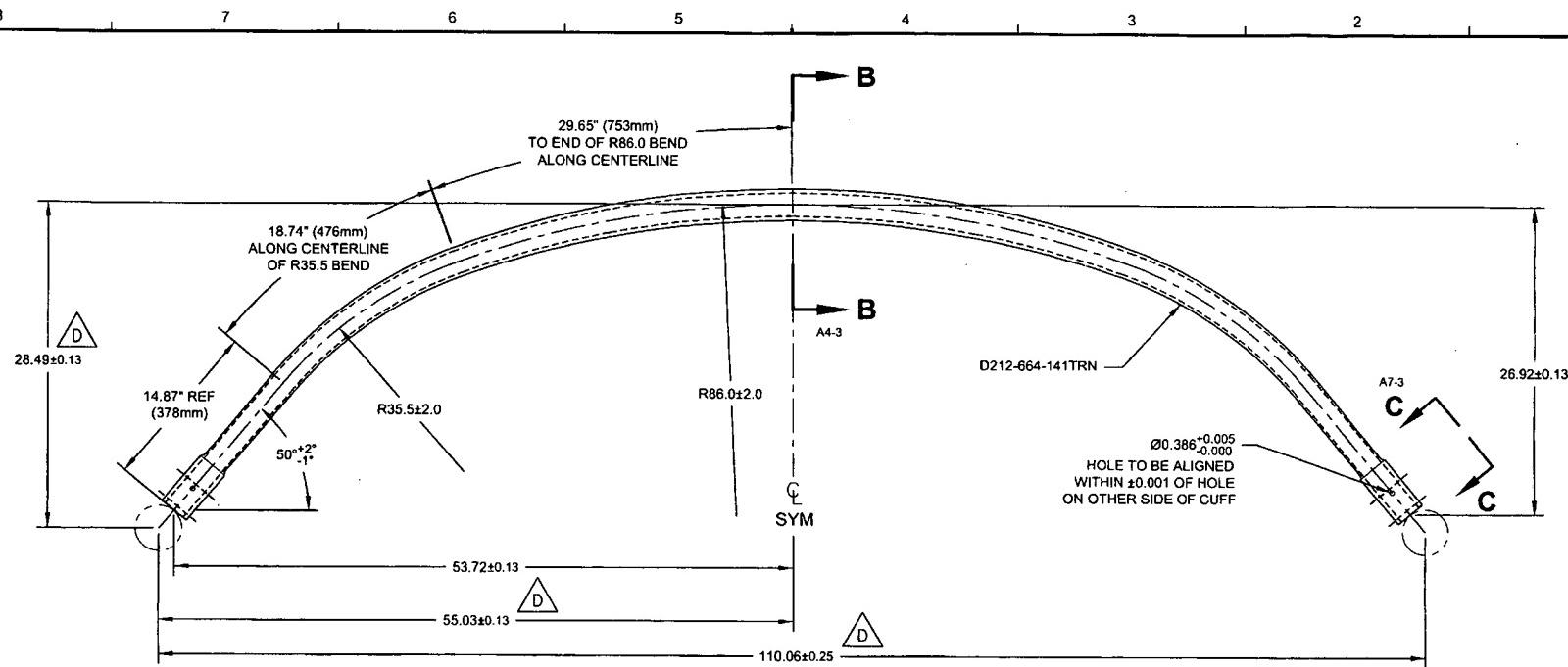
W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE			By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

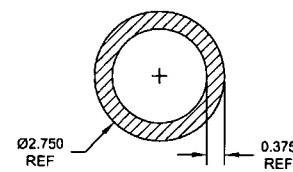
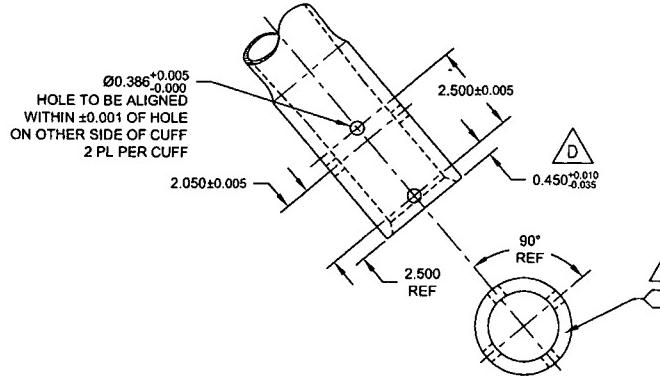
NOTE: Date & initial all entries



D212-664-501
BENDING AND DRILLING DETAIL [10] → D

W041737

RELEASED
2009-10-29
M



DESIGN	P4	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	PP	DRAWING NO.
MFG. APPR.	AA	D212-664-141
APPROVED	PP	REV. D
DE APPR.	PP	SHEET 3 OF 4
DATE	09.09.30	TITLE
		XTUBE ASSY (205/212/412 HI FWD)
		NTS

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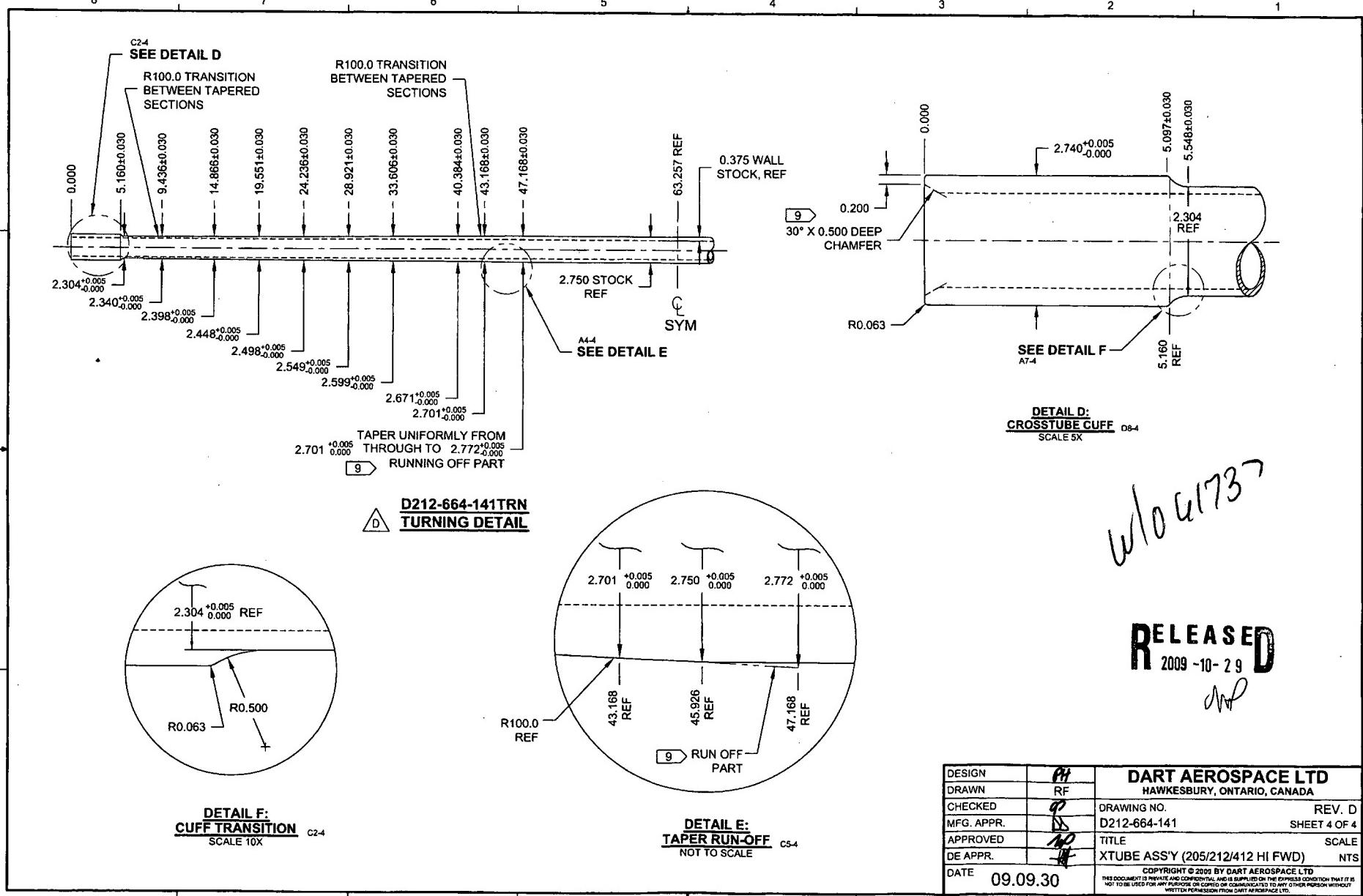
W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 15190.

CLIENT
ATTENTION
ADDRESS
PROJECT
ITEM(S) EXAMINED

DART AEROSPACE
LINDA / CHANTEL
1270 ABERDEEN
HAWKESBURY, ON.
K6H 1K7

DATE
ACUREN JOB NO.
PO/WO NO.
WORK LOCATION
ACCEPTANCE STD.

SEPT 18 2010
186-10-0838
12557
HAWKESBURY PLANT
ASTM 1417 REV./DATE 2007
ON CROSS TUBES

JOB DESCRIPTION

PROCEDURE NO. LT 0002 REV./DATE

TECHNIQUE NO. LT 1042 REV./DATE

PART NO.

MATERIAL Acuren Alum. Hard THICKNESS

SCOPE

WET FLUORESCENT LIQUID PENETRANT
INSPECTION CARRIED OUT 100 %

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGN AFRUX		BLACK LIGHT S/N 18459	<input type="checkbox"/> OUTPUT > 1000 μW/cm²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANT	2L67	MINIMUM DWELL TIME 45/10	MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER	H2O	MINIMUM DRY TIME 10	MIN.	OTHER LAB NO	
DEVELOPER	SKD 52	MINIMUM DWELL TIME 10	MIN.	LIGHT METER S/N 1098860	CAL DUE DATE OCT 14 2010
DEVELOPER TYPE	<input type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F		<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F

RESULTS- (METRIC IMPERIAL)

1 cross tube-W.O. 61736 ✓

1 cross tube-W.O. 61737 ✓

MM 10-09-10

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc., based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, express or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

Jan Tiffey

PRINT

SIGNATURE

DTR # E 63387

TECHNICIAN (SIGNATURE):

Nike Jokescos

NAME (PRINT):

1ST TECHNICIAN

SNT LEVEL

CGSB LEVEL

CGSB REG. NO.

6606

2ND TECHNICIAN

SNT LEVEL

CGSB LEVEL

CGSB REG. NO.

REPORT
REVIEWED BY:

NAME

INITIALS